

**Redescription of the poorly known porcelain crab,
Lissoporcellana nakasonei (Miyake, 1978)
(Crustacea: Decapoda: Anomura: Porcellanidae)**

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Abstract.—*Lissoporcellana nakasonei* (Miyake, 1978a) is redescribed based on the holotype specimen, which Miyake (1957) established as *Porcellana maculata*, and on material recently obtained. Miyake's *P. maculata* is a junior primary homonym of *P. maculata* H. Milne Edwards, 1837 (= *Neopetrolisthes maculatus*) and was replaced with *P. nakasonei* by Miyake (1978a). Reexamination of Miyake's specimen has revealed that *P. nakasonei* belongs in *Lissoporcellana* and resembles *L. miyakei* Haig, 1981 more closely than previously realized. *Lissoporcellana nakasonei* is distinguishable from *L. miyakei* primarily by the subparallel branchial margins of the carapace.

Lissoporcellana nakasonei (Miyake, 1978a) was originally described as *Porcellana maculata* by Miyake (1957), based on three male specimens collected from Tanabe Bay, Wakayama Prefecture (Kii Peninsula of Honshu mainland, Japan). In a species list of decapod crustaceans around the Amakusa Marine Biological Laboratory on the western coast of Kyushu, Japan, a new name, *Porcellana nakasonei*, was proposed by Miyake (1978a) for his *P. maculata* without comment, but probably because he noticed that the latter name was a junior primary homonym of *Porcellana maculata* H. Milne Edwards, 1837 [= *Neopetrolisthes maculatus* (H. Milne Edwards)]. Miyake's taxon can be readily distinguished from H. Milne Edwards' by the structure of the carapace. Haig (1978), unaware of Miyake's replacement of the name, assigned his *Porcellana maculata* to her new genus *Lissoporcellana* in a revision of the genus *Porcellana* Lamarck, 1801, and also pointed out that Miyake's species required a new name because of the homonymy; however, she did not examine material of Miyake's taxon.

Examination of the holotype of Miyake's species and comparison with material recently obtained from Kushimoto near the type locality, have confirmed that *Porcellana nakasonei* belongs in the genus *Lissoporcellana*. This species is here redescribed in detail, and is compared with the closely similar congener, *L. miyakei* Haig, 1981.

The carapace length (CL), an indication of specimen size, was measured from the anteromedian notch of rostrum to the posteromedian end of carapace. Measurements of chelipeds were made as follows: length of carpus, along dorsomedian longitudinal axis, and breadth on dorsal transverse midline (excluding the extensor teeth); length of chela, along extensor margin, and height along dorsodistal transverse line of palm; and length of dactyl, along flexor margin. Measurements of ambulatory legs were made as follows: length of merus, carpus, and propodus, along extensor margin; and height of propodus along lateral transverse midline. The holotype remains deposited in the Seto Marine Biological Laboratory, Kyoto University (SMBL) and additional

specimens examined are deposited in the Natural History Museum and Institute, Chiba (CBM).

Lissoporcellana nakasonei

(Miyake, 1978a)

Figs. 1–3

Porcellana maculata Miyake, 1957:75, figs. 1–3 (type locality: Shiso-jima, Tanabe Bay, Wakayama Pref.).—Miyake et al., 1962:125 (list). Not *Porcellana maculata* H. Milne Edwards, 1837 [= *Neopetrolisthes maculatus* (H. Milne Edwards)].

Porcellana nakasonei Miyake, 1978a:28 (list); 1978b:173 (key, English part), 149 (key, Japanese part).

Lissoporcellana maculata.—Haig, 1978:712.

Lissoporcellana nakasonei.—Miyake, 1982:204 (list), 240 (key).

Material examined.—Holotype, male (CL 3.8 mm), Shiso-jima (Tanabe Bay, Shirahama, Wakayama Pref.), commensal with *Dendronephthya gloriosa*, lobster gill net, 1 May 1954, coll. T. Yamamoto, SMBL 164.—1 male (CL 3.4 mm), Takatomi, Kushimoto, Wakayama Pref., associated with *Dendronephthya nipponica*, lobster gill net, 31 Mar 1995, coll. M. Osawa, CBM-ZC 3687.—1 female (CL 3.2 mm), 1 ovig. female (CL 3.7 mm), data as in CBM-ZC 3687, but attached to different host colony, CBM-ZC 3688.

Description.—Carapace (Fig. 1A, B) weakly or moderately convex dorsally, approximately 1.2 times as long as broad, broadest on median branchial margin. Branchial margins very weakly convex, subparallel, without distinct longitudinal ridge; anterior margin minutely denticulate, 1 or 2 spines at anterior corner larger than others; median margin with well developed spine; posterior margin and adjacent region with long oblique rugae. Rostrum (Fig. 1D–F) broad, horizontal, produced well beyond eyes, trilobate anteriorly; median lobe approximately 3.0 times as broad as laterals,

with median longitudinal, shallow groove extending near protogastric region, divided into 2 sublobes by V- or U-shaped anterior notch bearing 1 or 2 small spines or minute denticles; lateral lobes curved inwards on lateral distal margin, sharply pointed anteriorly; dorsal surface with numerous, very short, faint, transverse striae. Orbits (Fig. 1K, L) relatively shallow; supra-orbital margin strongly oblique, slightly convex, unarmed; outer orbital angle produced into acute, small or minute spine. Protogastric ridge almost very weakly demarcated. Gastric region covered with short, faint, transverse striae. Hepatic regions less striate than in gastric and branchial regions, bearing minute setae; lateral margin with strong acute spine. Cervical grooves weakly demarcated. Anterior branchial regions with short, faint, transverse striae less numerous than in gastric region. Inner posterior branchial and cardiac regions punctate or weakly striate, several striae with short setae.

Pterygostomian flaps (Fig. 1B, C) with strong longitudinal ridges, relatively weakly narrow posteriorly; anterior angle acutely pointed; anterodorsal margin with small spine near posterior end.

Third thoracic sternite (Fig. 1G, H) rather weakly depressed, trilobate anteriorly; median lobe much broader than laterals, with broadly truncate anterior margin; lateral lobes narrow, not exceeding median, with rounded apex. Fourth thoracic sternite with series of short, faint striae bearing several short or long setae along strongly concave, anterior margin.

Telson (Fig. 1I) composed of 7 plates; proximolateral plates much smaller than others; distal plates relatively broad.

Ocular peduncles (Fig. 1K) large, short, with several short and long striae on dorsal surface; dorsal extension onto cornea broadly triangular, with rounded apex.

Basal segment of antennular peduncles (Fig. 1J) transversely rugose on anterior region of ventral surface. Anterior margin minutely denticulate or tuberculate except for

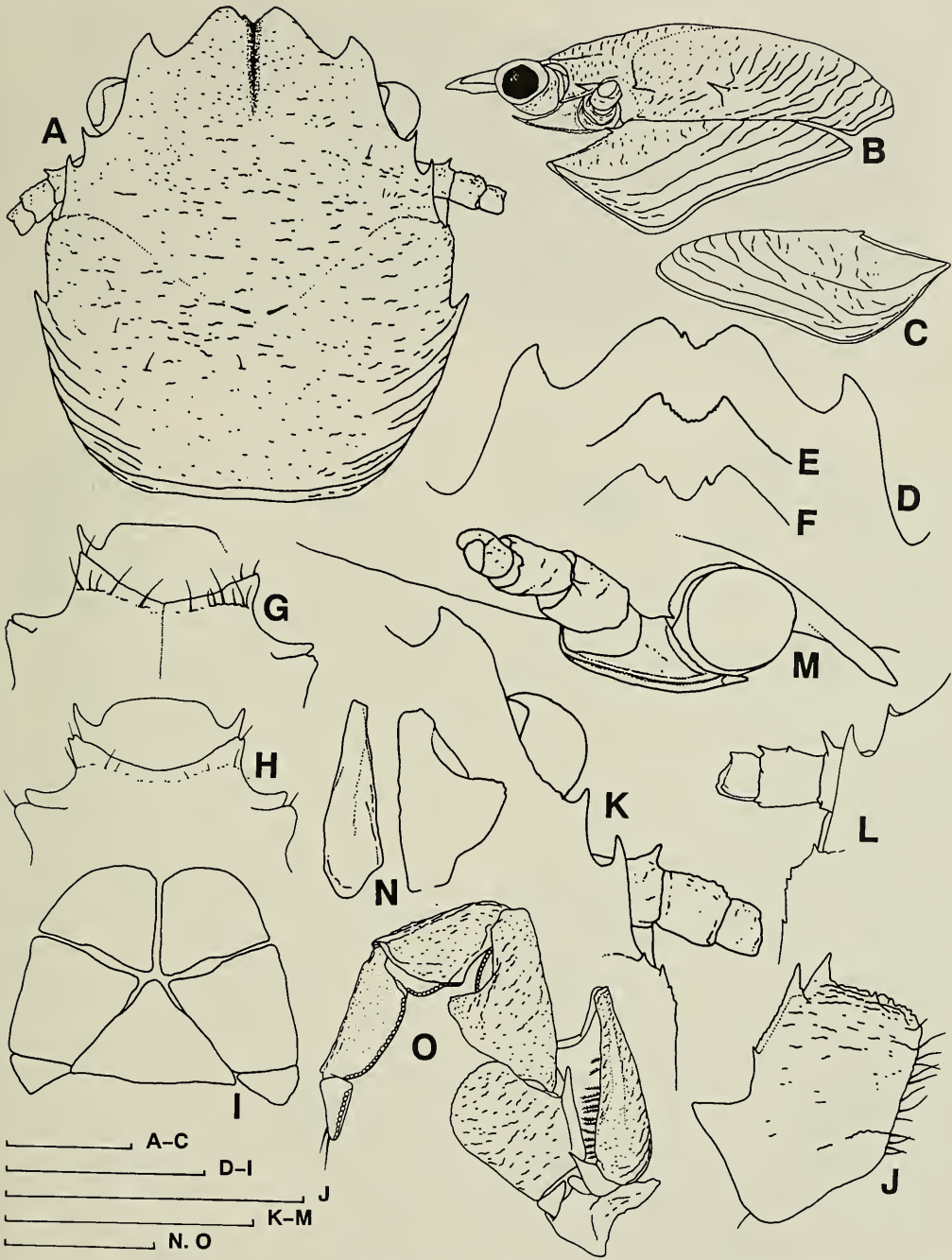


Fig. 1. *Lissoporcellana nakasoni* (Miyake, 1978a). A, C, D, G, I, K, M, N, holotype, male (CL 3.8 mm, SMBL 164); B, E, H, J, L, O, male (CL 3.4 mm, CBM-ZC 3687); F ovig. female (CL 3.7 mm, CBM-ZC 3688). A, carapace, dorsal; B, carapace and left pterygostomian flap, lateral; C, right pterygostomian flap, lateral; D, rostrum, dorsal; E, F, same, median lobe, dorsal; G, H, anterior thoracic sternites, ventral; I, telson, exposed; J, left basal segment of antennular peduncle, ventral; K, right anterior lateral part of carapace, eye, and antennal peduncle, dorsal; L, left anterior lateral part of carapace and antennal peduncle, dorsal; M, right eye and antennal peduncle, lateral; N, right third maxilliped, merus and exopod, ventral; O, left third maxilliped, ventral. Scales equal 1.0 mm.

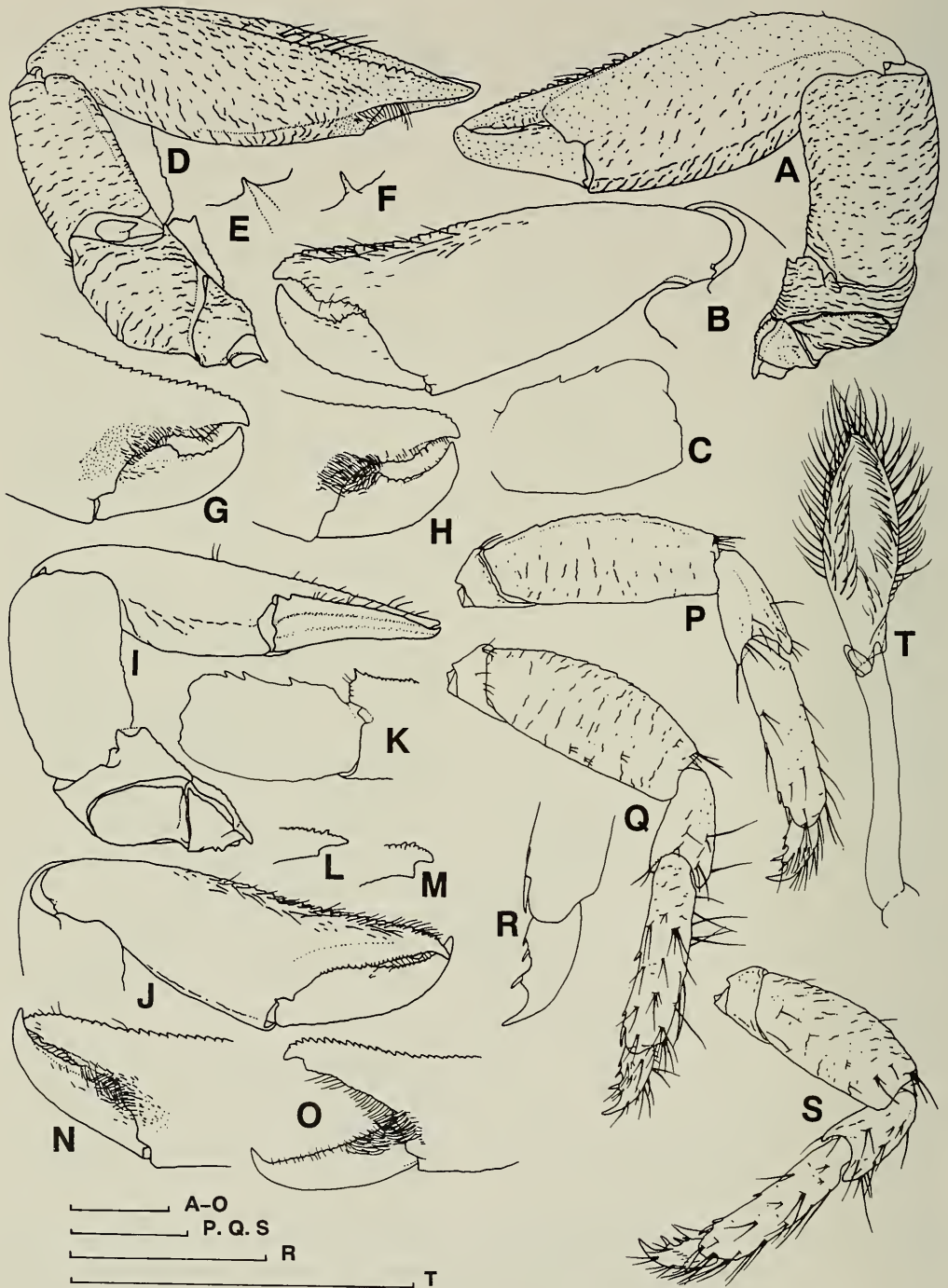


Fig. 2. *Lissoporcellana nakasonei* (Miyake, 1978a). A, B, D, E, G, I, J, L, N, P-S, holotype, male (CL 3.8 mm, SMBL 164); C, F, H, K, O, T, male (CL 3.4 mm, CBM-ZC 3687); M, ovig. female (CL 3.7 mm, CBM-ZC 3688). A, larger cheliped, right, dorsal; B, same, chela, dorsoextensor; C, same, carpus, dorsal; D, same, ventral; E, F, same, merus, distoflexor corner, ventral; G, H, same, chelae, distal part, ventral; I, smaller cheliped, left dorsal; J, same, chela, dorsoextensor; K, same, merus and carpus, dorsal; L, M, same, immovable

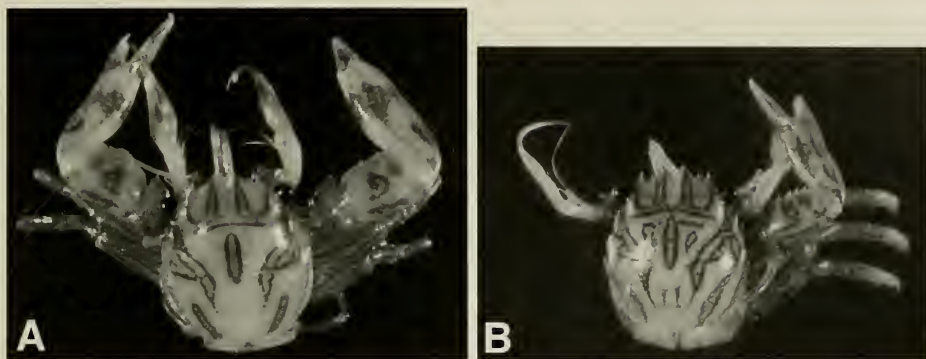


Fig. 3. *Lissoporcellana nakasoni* (Miyake, 1978a). Entire animal, dorsal. A, male (CL 3.4 mm), CBM-ZC 3687; B, female (CL 3.2 mm), CBM-ZC 3688.

2 strong acute spines at mesial corner. Lateral margin fringed with short setae.

Antennal peduncles (Fig. 1K–M) relatively short; first segment immovable, following 3 segments movable. First segment largest, strongly produced forward in lateral view, broadly in contact with anterior margin of carapace, acutely pointed anteriorly; with longitudinal rugose ridge along ventral margin. Second segment with slender spine near anterior distal corner. Third segment rather weakly elongate; anterior margin with minute protuberances, distal corner usually with small spine (unarmed or with weakly developed spine in each side of holotype). Fourth segment small, rounded. Dorsal and ventral surfaces of second to fourth segments slightly rugose.

Third maxillipeds (Fig. 1N, O) with ischium broad, ovate, transversely rugose on ventral surface; with longitudinal ridge along extensor margin; distoextensor corner with slender projection. Merus with laminate, subrectangular lobe bearing rounded projection on ventroflexor margin; moderately rugose on ventral surface. Carpus with broad triangular projection on median region of flexor margin and longitudinal rows

of short rugae along extensor margin on ventral surface. Propodus relatively slender, nearly smooth except for short rugae along extensor margin. Dactyl small, subtriangular; ventral surface smooth. Merus to dactyl with long setae on flexor margin (not illustrated). Exopod laminate, relatively robust; proximal region strongly inflated; distal region slender, with flagellum.

Chelipeds (Fig. 2A–O) subcylindrical, unequal (right larger than left in three of four specimens examined), not showing sexual dimorphism. Larger cheliped (Fig. 2A–H) with short merus; dorsal surface transversely rugose, with distinct transverse ridge submedially; dorsoflexor margin crenulated, distally with rounded or subrectangular lobe bearing small spine; dorsodistal margin unarmed; ventral surface transversely rugose, flexor corner with moderately or well developed, acute spine. Carpus 1.7–1.8 times as long as broad, broadened distally; dorsal surface with numerous, faint, short transverse rugae; dorsoextensor margin with strong oblique rugae, unarmed entirely; dorsoflexor margin weakly concave, slightly crenulated, lacking or with up to 3 acutely pointed, small teeth; dorsodistal

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finger, distal end, extensor; N, O, same, chela, distal part, ventral; P, right first ambulatory leg, lateral; Q, right second ambulatory leg, lateral; R, same, dactyl and distal part of propodus, lateral; S, right third ambulatory leg, lateral; T, male pleopod on second abdominal somite, inner. Scales equal 1.0 mm.

margin with broad rounded lobe on flexor part; ventral surface weakly rugose transversely, flexor margin slightly crenulate. Chela relatively narrow, elongate, approximately 2.1 times as long as carpus, 2.9 times as long as high, lying on extensor side; dactyl opening at more or less sharply oblique angle; extensor margin thin, weakly concave on distal $\frac{1}{3}$, unarmed except for serrated or denticulate distal part of palm and fixed finger, with short or minute setae on median part of palm to fixed finger. Palm with dorsal surface convex, covered with faint, short oblique rugae or small pits, no distinct median longitudinal ridge; dorsoflexor margin with longitudinal rugose ridge; ventral surface obliquely rugose. Fixed finger with slightly curved distal claw; dorsal surface with very short rugae, small pits, and several minute setae; dorsoflexor proximal part with broad, weakly developed rounded projection extending onto dactyl; cutting edge minutely tuberculate, median part with broad, low, rounded or subtriangular tooth; ventral surface with very short rugae and small pits, proximal flexor part with fringe of short setae extending to cutting edge. Dactyl approximately 0.4 of chela length, as long as fixed finger, with strongly curved distal claw, dorsal and ventral surfaces with very short rugae and small pits; cutting edge minutely tuberculate, with broad, rounded tooth and more or less developed fringe of short setae on ventral proximal part.

Smaller cheliped (Fig. 2I–O) almost identical to larger, except for: carpus lacking or with up to 4 acutely pointed, small teeth on dorsoflexor margin; chela narrower, approximately 3.5 times as long as high, with dactyl usually opening at near vertical angle; fingers crossed distally, with more sharply pointed claw; fixed finger with dorsal surface provided with broad subtriangular or narrowly pointed projection extending onto dactyl on proximal flexor part, cutting edge lacking distinct tooth, distal end weakly bifurcate; and dactyl approxi-

mately 0.5 of chela length, slightly longer than fixed finger.

Ambulatory legs (Fig. 2P–S) relatively slender, with scattered, short and relatively long setae (propodus and dactyl more setose than in other segments). Merus elongate, first and second legs subequal and longer than third, lateral surface with short transverse rugae, extensor margin unarmed but slightly serrated, distoflexor part with rounded lobe minutely granulated or serrated marginally. Carpus with 1 or 2 weakly marked, longitudinal rows of short rugae on lateral surface; disto-extensor corner unarmed. Propodus 1.6–1.7 times as long as carpus, 4.0–4.1 times as long as high; lateral surface with several short, oblique rugae; flexor margin with 4 movable spines, distal pair much larger than median and subdistal spines. Dactyl terminating in narrow, moderately or strongly curved claw; flexor margin with 3 corneous spines progressively smaller proximally, proximal 2 spines movable, distal spine fixed, distinctly larger than others, with enlarged, produced base adjacent to terminal claw.

Fifth pereopod small, slender, chelate; propodus with approximately 10 hooked setae.

Males with pair of developed pleopods on second abdominal somite (Fig. 2T); protopod naked; endopod spoon-shaped, ovate with narrowly rounded distal apex, bearing numerous marginal setae except for proximal part; exopod small, ovate, naked; no traces of pleopods on third to fifth abdominal somites. Females with paired pleopods on third to fifth abdominal somites; third pair small, fourth and fifth pairs well developed.

Color (Fig. 3A, B).—Background color of carapace, abdomen, and pereopods white. Carapace with reddish line along protogastric ridge and lateral lobes of rostrum, and reddish ovate ring markings on following regions: 2 in frontal, 1 in gastric, and 3 in branchial regions, each sometimes with smaller markings. Chelipeds with several scattered, reddish ovate markings on

dorsal surface. Ambulatory legs with 2 or 3 reddish, longitudinal stripes on lateral surface.

Habitat.—The specimens recently obtained were found on colonies of a reddish alcyonacean octocoral, *Dendronephthya nipponica* Utinomi, caught with gill nets used in spiny lobster fishing. The nets are generally set in depths of approximately 20 m on rocky shore.

Distribution.—This species has been recorded only from Japan, southwestern coast of Kii Peninsula of Honshu mainland (Miyake 1957, present study) and Amakusa in the middle western coast of Kyushu (Miyake et al. 1962).

Remarks.—The present species is assignable to *Lissoporcellana* based on the following: rather smooth (weakly striate) carapace with a broad, horizontal trilobate rostrum (median lobe with an anterior notch) and indistinctly marked regions; first segment of antennal peduncle strongly produced forward in lateral view, and broadly in contact with anterior margin of carapace; unequal, subcylindrical chelipeds with fingers opening at a rather sharply oblique angle; and asymmetry of chelipeds in size and armature of carpus and chela, and degree of bending of fingers (indistinctly bent), not due to sexual dimorphism.

Reexamination of the holotype specimen has revealed that a number of features had not been previously reported: the fingers of both chelae possess a weakly developed fringe of short setae on the ventral proximal base and cutting edges; the fixed finger of the smaller chela is weakly bifurcate at the distal end; and the propodi of all three ambulatory legs are provided with a median small spine on the flexor margin and their dactyls have a fixed spine with an enlarged, produced base adjacent to the terminal claw.

Although Haig (1981) discussed morphological differences between *L. nakasonei* and its closely similar congener, *L. miyakei* Haig, 1981, all differences such as presence of setae on the gape of the fingers and distal

bifurcation on the fixed finger of the smaller cheliped, and armature of dactyls of ambulatory legs, were found to be incorrect during the present study. *Lissoporcellana nakasonei*, however, can be distinguished from *L. miyakei* by another character on the carapace. The branchial margins are subparallel in *L. nakasonei*, whereas they are strongly convex in *L. miyakei*.

Haig (1978) mentioned that Monod's (1973) "*Porcellana* sp." was perhaps identical with *Lissoporcellana nakasonei* (as *L. maculata*). However, Monod's figures (figs. 44–51) show a female specimen that differs from *L. nakasonei* in having strongly convex branchial margins of the carapace with two spines on the median part. As the armature of the anterior margin of the rostrum and the branchial margins of the carapace of his specimen does not appear to fit any known species of *Lissoporcellana*, it may well belong to another, perhaps undescribed species.

Lissoporcellana now contains nine Indo-West Pacific species (Haig 1981, Yang & Sun 1992). Most of the species are known to be associated with sponges, hydrozoans, or anthozoans such as scleractinians, antipatharians, alcyonaceans, and gorgonaceans (Haig 1981). *Lissoporcellana nitida* (Haswell, 1882) and *L. furcillata* (Haig, 1965), in particular, are quite distinct in that the dactyls of the ambulatory legs have deeply bifurcated tips forming two strong fixed claws (see Haig 1965). Although this structure resembles those of species of the commensal genera such as *Polyonyx* Stimpson, 1858, *Aliaporcellana* Nakasone & Miyake, 1969, and *Euleniaios* Ng & Nakasone, 1993 (see Ng & Nakasone 1993, Ng & Sasekumar 1993, Ng & Goh 1996), *Lissoporcellana* seems to be more allied to *Pisidia* Leach, 1820, in the general appearance, including the trilobate or tridentate horizontal rostrum (some species of the latter genus have a weakly or moderately deflexed rostrum) and the bending of the fingers of the smaller cheliped. The similarity of structure on the ambulatory dactyls may be the result

of habitat or degree of dependence on the host.

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Literature Cited

- Haig, J. 1965. The Porcellanidae (Crustacea, Anomura) of Western Australia with descriptions of four new Australian species.—*Journal of the Royal Society of Western Australia* 48:97–118.
- . 1978. Contribution toward a revision of the porcellanid genus *Porcellana* (Crustacea: Decapoda: Anomura).—*Proceedings of the Biological Society of Washington* 91:706–714.
- . 1981. Porcellanid crabs from the Indo-West Pacific, Part II.—*Steenstrupia* 7:269–291.
- Haswell, W. A. 1882. Catalogue of the Australian stalk- and sessile-eyed Crustacea. Australian Museum, Sydney, xxiv + 326 pp.
- Lamarck, J. B. P. A. 1801. *Système des animaux sans vertèbres, ou tableau général des classes, des ordres et des genres de ces animaux; présentant leurs caractères essentiels et leur distribution, d'après la considération de leurs rapports naturels et de leur organisation, et suivant l'arrangement établi dans les galeries du Muséum d'Histoire naturelle, parmi leurs dépouilles conservées; précédé du discours d'ouverture du cours de zoologie, donné dans le Muséum national d'Histoire naturelle l'an 8 de la République.* Paris, viii + 432 pp.
- Leach, W. E. 1820. Galatéadées. *Dictionnaire des Sciences Naturelles* 18:49–56. Strasbourg, F. G. Levrault and Paris, Le Normant.
- Milne Edwards, H. 1837. Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux 2:1–532. Paris.
- Miyake, S. 1957. A new porcellanid crab from middle Japan.—*Publications of the Seto Marine Biological Laboratory* 6:75–78.
- . 1978a. [*Porcellana nakasonei*, nom. nov.] Pp. 28–29 in Y. Nakasone, Porcellanidae. In: T. Kikuchi and S. Miyake, eds., *Fauna and flora of the sea around the Amakusa Marine Biological Laboratory. Decapod Crustacea* (Revised edition). Amakusa Marine Biological Laboratory, 52 pp. (In Japanese.)
- . 1978b. The crustacean Anomura of Sagami Bay. Biological Laboratory, Imperial Household. Hoikusha, Osaka, Japan, ix + 200 pp. (English part), 161 pp. (Japanese part).
- . 1982. Japanese crustacean decapods and stomatopods in color. I. Macrura, Anomura and Stomatopoda. Hoikusha, Osaka, Japan, viii + 261 pp. (In Japanese.)
- , K. Sakai, & S. Nishikawa. 1962. A fauna-list of the decapod Crustacea from the coasts washed by the Tsushima warm current.—*Records of Oceanographical Works in Japan, Special Number* 6:121–131.
- Monod, T. 1973. Sur quelques Crustacés de Nouvelle-Calédonie.—*Cahiers du Pacifique* 17:7–23.
- Nakasone, Y., & S. Miyake. 1969. A new porcellanid crab (Anomura: Porcellanidae) from Japan (*Aliaporcellana kikuchii* gen. et sp. nov.), with description of two species of the new genus.—*Publications of the Amakusa Marine Biological Laboratory* 2:17–32.
- Ng, P. K. L., & Y. Nakasone. 1993. Taxonomy and ecology of the porcellanid crab *Polyonyx cometes* Walker, 1887 (Crustacea: Decapoda), with description of a new genus.—*Journal of Natural History* 27:1103–1117.
- , & A. Sasekumar. 1993. A new species of *Polyonyx* Stimpson, 1858, of the *P. sinensis* group (Crustacea: Decapoda: Anomura: Porcellanidae) commensal with a chaetopterid worm from Peninsular Malaysia.—*Zoologische Mededelingen* 67:467–472.
- , & N. K. C. Goh. 1996. Notes on the taxonomy and ecology of *Aliaporcellana telestophila* (Johnson, 1958) (Decapoda, Anomura, Porcellanidae), a crab commensal on the gorgonian *Solenocaulon*.—*Crustaceana* 69:652–661.
- Stimpson, W. 1858. Prodomus descriptionis animalium evertibratorum, quae in expeditione ad oceanum pacificum septentrionalem, a republica federata missa, Cadwaladaro Ringgold et Johanne Rodgers ducibus, observavit et descripsit. Pars VII. Crustacea Anomura.—*Proceedings of the Academy of Natural Sciences of Philadelphia* 10:225–252.
- Yang, S., & X. Sun. 1992. On the porcellanid crab (Anomura: Porcellanidae) of Guangxi Province, China.—*Transactions of the Chinese Crustacean Society* 3:196–213. (In Chinese with English abstract.)